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of

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for

METHODS AND SYSTEMS FOR PREEMPTIVE REJECTION OF CALLS

RELATED APPLICATIONS

[001] This application is a continuation-in-part of U.S. Patent Application No. 10/083,792, entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," filed February 27, 2002; U.S. Patent Application No. 10/083,884, entitled "DEVICE INDEPENDENT CALLER ID," filed February 27, 2002; and U.S. Patent Application No. 10/083,822, entitled "METHOD AND APPARATUS FOR A UNIFIED COMMUNICATION MANAGEMENT VIA INSTANT MESSAGING," filed February 27, 2002, all of which claim priority to U.S. Provisional Patent Application Nos. 60/272,122, 60/272,167, 60/275,667, 60/275,719, 60/275,020, 60/275,031, and 60/276,505, and all of which are expressly incorporated herein by reference in their entirety.

[002] Applicants also claim the right to priority under 35 U.S.C. § 119(e) based on Provisional Patent Application No. 60/428,704, entitled "DIGITAL COMPANION," filed November 25, 2002; and Provisional Patent Application No. 60/436,018, entitled "DIGITAL COMPANION," filed December 26, 2002, both of which are expressly incorporated herein by reference in their entirety.

[003] The present application also relates to U.S. Patent Application No. 10/083,793, entitled "METHOD AND APPARATUS FOR CALENDARED COMMUNICATIONS FLOW CONTROL," filed February 27, 2002; U.S. Patent Application No. 10/084,121, entitled "CALENDAR-BASED CALLING AGENTS," filed February 27, 2002; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR DRAG AND DROP CONFERENCE CALLING," Attorney Docket No. 03-1012; U.S. Patent Application No. (__________), entitled "METHODS AND

SYSTEMS FOR CONFERENCE CALL BUFFERING," Attorney Docket No. 03-1013; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR COMPUTER ENHANCED CONFERENCE CALLING," Attorney Docket No. 03-1014; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR REMOTE CALL ESTABLISHMENT," Attorney Docket No. 03-1015; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR CALL MANAGEMENT WITH USER INTERVENTION," Attorney Docket No. 03-1016; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR DIRECTORY INFORMATION LOOKUP," Attorney Docket No. 03-1017; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR AUTOMATICALLY FORWARDING CALLS TO CELL PHONE," Attorney Docket No. 03-1018; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR ADAPTIVE MESSAGE AND CALL NOTIFICATION," Attorney Docket No. 03-1019; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR A CALL LOG," Attorney Docket No. 03-1020; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR AUTOMATIC FORWARDING OF CALLS TO A PREFERRED DEVICE," Attorney Docket No. 03-1021; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR MULTI-LINE INTEGRATED DEVICE OR LINE MANAGEMENT," Attorney Docket No. 03-1022; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR CONTACT MANAGEMENT," Attorney Docket No. 03-1023; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR

NOTIFICATION OF CALL TO PHONE DEVICE," Attorney Docket No. 03-1024; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR SINGLE NUMBER TEXT MESSAGING," Attorney Docket No. 03-1025; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR MULTI-USER SELECTIVE NOTIFICATION," Attorney Docket No. 03-1026; U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR CPN TRIGGERED COLLABORATION," Attorney Docket No. 03-1027; and U.S. Patent Application No. (__________), entitled "METHODS AND SYSTEMS FOR PREEMPTIVE REJECTION OF CALLS," Attorney Docket No. 03-1028, all of which are expressly incorporated herein by reference in their entirety.

TECHNICAL FIELD

[004] The present invention relates generally to data processing systems and, more particularly, to a method and system for preemptively rejecting phone calls.

BACKGROUND

[005] A wide variety of means exist for communication between users. For example, a user may conduct phone calls via a home phone, work phone, and mobile phone. In addition, users may also communicate using devices such as PC's, PDA's, pagers, etc. using manners of communicating such as email and instant messaging.

[006] Unfortunately, managing such a wide variety of communication means can be difficult. In particular, as a user changes location, communication with the user may vary. For example, while on travel, it may only be possible to reach a user by

mobile phone. However, the user may best be reached by email while at work. Also, the user may wish to implement various rules for receiving and controlling communications. For example, to be reached at home, the user may want the home phone to ring three times before forwarding the call to a mobile phone. As another example, the user may wish to be paged each time an email is received from a particular person while away from the office.

[007] A user may also wish to treat a phone call differently dependent on who is calling the user. For example, if a user receives a call from a caller that the user does not want to speak to at the moment, the user may want to send that call directly to voice mail. Also, if a user receives a call from a number that displays no caller ID information or that the user otherwise does not recognize, the user may wish to somehow specially treat the call because the caller is a potential telemarketer.

[008] Current call screening systems may recognize that the caller ID of a calling part is blocked or unavailable and allow the called party to make a decision on how to dispose of the call while the calling party is still on the line.

[009] Current call screening systems, however, do not enable a user to make such a decision when the user is away from the specific device belonging to the called telephone number. Moreover, current call screening systems do not enable a user to manually initiate call screening in real-time.

SUMMARY OF THE INVENTION

[010] Methods and systems consistent with the principles of the invention screen calls. A first server receives information pertaining to a call to a user from a calling party. The first server then determines whether a real-time call management function is enabled for the user and determines whether a calling party number associated with the calling party is valid when the real-time call management function is not enabled. A call screening function is performed when the calling party number is invalid. The first server provides a notification of the call to a device associated with the user when the real-time call management function is enabled. A second server initiates the call screening function when the user selects a call screening option included in the notification.

[011] Other methods and systems consistent with the principles of the invention also screen calls. A first server receives information pertaining to a call to a user from a calling party and retrieves data corresponding to the user using the information pertaining to the call. The first server then determines whether a real-time call management function is enabled for the user and determines whether a calling party number associated with the calling party is valid when the real-time call management function is not enabled. A call screening function is performed when the calling party number is invalid. The first server also selects a device associated with the user to receive a notification of the call based on the retrieved data and provides the notification of the call to the selected device when the real-time call management

function is enabled. A second server initiates the call screening function when the user selects a call screening option included in the notification.

[012] Another method and system consistent with the principles of the invention screens a call. A device associated with a user receives notification of a call to the user. The notification includes a user-selectable call screening option and is received based on a determination that a real-time call management function is enabled for the user, wherein when the real-time call management function is not enabled for the user, a call screening function is performed if a calling party number associated with the calling party is invalid. The device also receives input from the user indicative of selection of the call screening option. Thereafter, the device sends, to a server, information reflective of the selection of the call screening option, wherein the server initiates the call screening function responsive to the selection of the call screening option.

BRIEF DESCRIPTION OF THE DRAWINGS

[013] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate one embodiment of the invention and, together with the description, serve to explain the principles of the invention.

[014] Fig. 1 is a diagram of an exemplary data processing and telecommunications environment in which features and aspects consistent with the principals of the present invention may be implemented;

[015] Fig. 2 is a diagram of an exemplary user terminal, consistent with the principals of the present invention;

[016] Fig. 3 is a diagram of a voice network, consistent with the principles of the present invention;

[017] Fig. 4 is a block diagram of a service center, consistent with the principles of the present invention;

[018] Fig. 5 illustrates a logical architecture of an exemplary system, consistent with the present invention;

[019] Figs. 6A and 6B comprise a diagram of an exemplary flowchart of a method for preemptively rejecting phone calls in a manner consistent with the present invention;

[020] Fig. 7 is a diagram of an exemplary user interface including customer-selectable real-time call management options consistent with the present invention; and

[021] Fig. 8 is a diagram of an exemplary user interface that enables a customer to change preferences consistent with the present invention.

DETAILED DESCRIPTION

[022] Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts. While the description includes exemplary embodiments, other embodiments are possible, and changes may be made to the

embodiments described without departing from the spirit and scope of the invention. The following detailed description does not limit the invention. Instead, the scope of the invention is defined by the appended claims and their equivalents.

Overview

[023] Methods and systems consistent with the present invention screen a call. A service center receives information pertaining to a call to a user from a calling party and retrieves data corresponding to the user using the information pertaining to the call. The service center also determines whether a real-time call management function is enabled for the user. If the real-time call management function is not enabled, then the service center determines whether a calling party number associated with the calling party is valid. A call screening function is performed when the calling party number is invalid. Moreover, the service center selects a device associated with the user to receive a notification of the call based on the retrieved data corresponding to the user. Thereafter, the service center provides the notification of the call to the selected device based on a determination that the real-time call management function is enabled, and initiates the call screening function when the user selects a call screening option included in the notification.

Network Environment

[024] Fig. 1 is a block diagram of a data processing and telecommunications environment 100, in which features and aspects consistent with the present invention may be implemented. The number of components in environment 100 is not limited to what is shown and other variations in the number of arrangements of components are

possible, consistent with embodiments of the invention. The components of Fig. 1 may be implemented through hardware, software, and/or firmware. Data processing and telecommunications environment 100 may include a data network 102, a voice network 104, and a service center 106. A user 110 may use a user terminal 112 to interface with data network 102 and may use phones 114, 116, and 118 to interface with voice network 104. A calling party 120 may use phone 122 to call a user, such as user 110, at any one of phones 114, 116, and 118.

[025] Data network 102 provides communications between the various entities depicted in environment 100 of Fig. 1, such as user terminal 112 and service center 106. Data network 102 may be a shared, public, or private network and encompass a wide area or local area. Data network 102 may be implemented through any suitable combination of wired and/or wireless communication networks. By way of example, data network 102 may be implemented through a wide area network (WAN), local area network (LAN), an intranet and/or the Internet. Further, service center 106 may be connected to multiple data networks 102, such as, for example, to a wireless carrier network and to the Internet.

[026] Voice network 104 may provide telephony services to allow a calling party, such as calling party 120, to place a telephone call to user 110. In one embodiment, voice network 104 may be implemented using a network, such as the Public Switched Telephone Network ("PSTN"). Alternatively, voice network 104 may be implemented on a voice over broadband network, such as a network using voice-over Internet Protocol ("VoIP") technology. Additionally, in other embodiments, voice network 104 may be a

video over broadband network, such as, for example, a network for providing 2-way video communications. In another example, voice network 104 may be a wireless broadband network, such as, for example, a network using WiFi (i.e., IEEE 802.11(b) and/or (g)). In yet another example, voice network 104 may be a wireless voice network(s), such as, for example, a cellular or third-generation cellular network). In addition, voice network 104 may be implemented using any single or combination of the above-described technologies consistent with the principles of the present invention. Further, service center 106 may be connected to multiple voice networks 104, such as for example, Verizon's™ Voice Network, voice networks operated by other carriers, and wireless carrier networks.

[027] Service center 106 provides a platform for managing communications over data network 102 and voice network 104. Service center 106 also provides gateway functions, such as code and protocol conversions, to transfer communications between data network 102 and voice network 104. Service center 106 may be implemented using a combination of hardware, software, and/or firmware. For example, service center 106 may be implemented using a plurality of general purpose computers or servers coupled by a network (not shown). Although service center 106 is shown with direct connections to data network 102 and voice network 104, any number and type of network elements may be interposed between service center 106, data network 102, and voice network 104.

[028] User terminal 112 provides user 110 an interface to data network 102. For example, user terminal 112 may be implemented using any device capable of

accessing the Internet, such as a general purpose computer or personal computer equipped with a modem. User terminal 112 may also be implemented in other devices, such as the Blackberry™, and Ergo Audrey™. Furthermore, user terminal 112 may be implemented in wireless devices, such as pagers, mobile phones (with data access functions), and Personal Digital Assistants ("PDA") with network connections.

[029] User terminal 112 also allows user 110 to communicate with service center 106. For example, user 110 may use instant messaging ("IM") to communicate with service center 106. In addition, user terminal 112 may use other aspects of TCP/IP including the hypertext transfer protocol ("HTTP"); the user datagram protocol ("UDP"); the file transfer protocol ("FTP"); the hypertext markup language ("HTML"); and the extensible markup language ("XML").

[030] Furthermore, user terminal 112 may communicate directly with service center 106. For example, a client application may be installed on user terminal 112, which directly communicates with service center 106. Also, user terminal 112 may communicate with service center 106 via a proxy.

[031] Phones 114, 116, 118, and 122 interface with voice network 104. Phones 114, 116, 118, and 122 may be implemented using known devices, including wireline phones and mobile phones. Although phones 114, 116, 118, and 122 are shown directly connected to voice network 104, any number of intervening elements, such as a private branch exchange ("PBX"), may be interposed between phones 114, 116, 118, and 122 and voice network 104.

[032] Fig. 2 is a block diagram of a user terminal consistent with the present invention. User terminal 112 may include a central processing unit (CPU) 200, a memory 202, a storage module 204, a network interface 206, an input interface 208, an output interface 210, an input device 216, and an output device 218.

[033] CPU 200 provides control and processing functions for user terminal 112. Although Fig. 2 illustrates a single CPU, user terminal 112 may include multiple CPUs. CPU 200 may also include, for example, one or more of the following: a co-processor, memory, registers, and other processing devices and systems as appropriate. CPU 200 may be implemented, for example, using a Pentium™ processor provided from Intel Corporation.

[034] Memory 202 provides a primary memory for CPU 200, such as for program code. Memory 202 may be embodied with a variety of components of subsystems, including a random access memory ("RAM") and a read-only memory ("ROM"). When user terminal 112 executes an application installed in storage module 204, CPU 200 may download at least a portion of the program code from storage module 204 into memory 202. As CPU 200 executes the program code, CPU 200 may also retrieve additional portions of program code from storage module 204.

[035] Storage module 204 may provide mass storage for user terminal 112. Storage module 204 may be implemented with a variety of components or subsystems including, for example, a hard drive, an optical drive, CD ROM drive, DVD drive, a general-purpose storage device, a removable storage device, and/or other devices capable of storing information. Further, although storage module 204 is shown within

user terminal 112, storage module 204 may be implemented external to user terminal 112.

[036] Storage module 204 includes program code and information for user terminal 112 to communicate with service center 106. Storage module 204 may include, for example, program code for a calendar application, such as GroupWise provided by Novell Corporation or Outlook provided by Microsoft Corporation; a client application, such as a Microsoft Network Messenger Service (MSNMS) client or America Online Instant Messenger (AIM) client; and an Operating System (OS), such as the Windows Operation System provided by Microsoft Corporation. In addition, storage module 204 may include other program code and information, such as program code for TCP/IP communications; kernel and device drivers; configuration information, such as a Dynamic Host Configuration Protocol (DHCP) configuration; a web browser, such as Internet Explorer provided by Microsoft Corporation, or Netscape Communicator provided by Netscape Corporation; and any other software that may be installed on user terminal 112.

[037] Network interface 206 provides a communications interface between user terminal 112 and data network 102. Network interface 206 may receive and transmit communications for user terminal 112. For example, network interface 206 may be a modem, or a local area network ("LAN") port.

[038] Input interface 208 receives input from user 110 via input device 212 and provides the input to CPU 200. Input device 212 may include, for example, a keyboard,

a microphone, and a mouse. Other types of input devices may also be implemented consistent with the principles of the present invention.

[039] Output interface 210 provides information to user 110 via output device 214. Output device 214 may include, for example, a display, a printer, and a speaker. Other types of output devices may also be implemented consistent with the principles of the present invention.

[040] Fig. 3 is a diagram of a voice network, consistent with the principles of the present invention. As shown, voice network 104 includes an intelligent service control point (ISCP) 302, service transfer points (STP) 304 and 306, service switching points (SSP) 308 and 310, a line information database (LIDB) 312, an ISCP Service Provisioning And Creation Environment (SPACE) 314, a Recent Change Environment 316, an Intelligent Peripheral (IP) 320, and a switch access 322. Although this embodiment of a voice network 104 is described as a PSTN, as discussed above in other embodiments, the voice network 104 may be, for example, a voice or video over broadband network a wireless broadband, a wireless voice network, etc.

[041] Voice network 104 may be implemented using the PSTN and SS7 as a signaling protocol. The SS7 protocol allows voice network 104 to provide features, such as call forwarding, caller-ID, three-way calling, wireless services such as roaming and mobile subscriber authentication, local number portability, and toll-free/toll services. The SS7 protocol provides various types of messages to support the features of voice network 104. For example, these SS7 messages may include Transaction Capabilities

Applications Part ("TCAP") messages to support event "triggers," and queries and responses between ISCP 302 and SSPs 308 and 310.

[042] ISCP 302 may also be, for example, a standard service control point (SCP), an Advanced Intelligent Network (AIN) SCP, a soft switch, or any other network call controller. ISCP 302 provides translation and routing services of SS7 messages to support the features of voice network 104, such as call forwarding. In addition, ISCP 302 may exchange information with the service center 106 using TCP/IP or SS7. ISCP 302 may include service logic used to provide a switch, such as SSP 308 or 310, with specific call processing instructions. ISCP 302 may also store data related to various features that a user may activate. Such features may include, for example, call intercept and voice mail. ISCP 302 may be implemented using a combination of known hardware and software. ISCP 302 is shown with a direct connection to service center 106 and a connection to ISCP SPACE 314, however, any number of network elements including routers, switches, hubs, etc., may be used to connect ISCP 302, ISCP SPACE 314, and service center 106. Further, information exchanged between the ISCP 302 and service center 106 may use, for example, the SR-3389 General Data Interface (GDI) for TCP/IP.

[043] STPs 304 and 306 relay SS7 messages within voice network 104. For example, STP 304 may route SS7 messages between SSPs 308 and 310. STP 304 or 306 may be implemented using known hardware and software from manufacturers such as NORTEL™ and LUCENT Technologies™.

[044] SSPs 308 and 310 provide an interface between voice network 104 and phones 114 and 120, respectively, to setup, manage, and release telephone calls within voice network 104. SSPs 308 and 310 may be implemented as a voice switch, an SS7 switch, or a computer connected to a switch. SSPs 308 and 310 exchange SS7 signal units to support a telephone call between calling party 120 and user 110. For example, SSPs 308 and 310 may exchange SS7 messages, such as TCAP messages, within message signal units ("MSU") to control calls, perform database queries to configuration database 312, and provide maintenance information.

[045] Line Information Database (LIDB) 312 comprises one or more known databases to support the features of voice network 104. For example, LIDB 312 may include subscriber information, such as a service profile, name and address, and credit card validation information. Although, in this figure, LIDB 312 is illustrated as directly connected to ISCP 302, LIDB 312 may be connected to ISCP 302 through an STP (e.g., 304 and 306). Additionally, this communication link may use, for example, the GR-2838 General Dynamic Interface (GDI) for SS7.

[046] ISCP Service Provisioning and Creation Environment (SPACE) 314 may be included as part of ISCP 302 or be separate from the ISCP 302. For example, the Telcordia™ ISCP may include an environment similar to SPACE 314 as part of the product. Further, ISCP SPACE 314 may include one or more servers. ISCP SPACE 314 is the point in the ISCP platform where customer record updates may be made.

[047] In one embodiment, customer records may be stored in the ISCP SPACE 314 such that the records may be updated and sent to ISCP 302. These records may

include information regarding how to handle calls directed to the customer. For example, these customer records may include information regarding whether or not calls for the customer are to be forwarded to a different number, and/or whether or not the call should be directed to an IP, such as a voice mail system, after a certain number of rings. Additionally, one ISCP SPACE 314 may provide updates to one or more ISCPs 302 via an ISCP network (not shown).

[048] Additionally, voice network 104 may include one or more recent change engines 316 such as, for example, an Enterprise Recent Change engine (eRC); an Assignment, Activation, and Inventory System (AAIS); or a multi-services platform (MSP). As an example, the eRC and AAIS may be used in voice networks 104 located in the western part of the United States, while an MSP may be used in networks in the eastern part. The recent change engines may be used to update switch and ISCP databases. For example, a recent change engine may deliver database updates to SSPs and to ISCPs, such that when updating databases, these recent change engines emulate human operators. Additionally, if the instructions are to be sent to an ISCP 302, the recent change engine may first send the instructions to ISCP SPACE 314, which then propagates the instructions to ISCP 302 as discussed above. Further, an MSP or eRC may be used, for example, for providing updates to both SSPs 308 or 310 and ISCPs 302. Or, for example, an eRC may be used for providing updates to SSPs 308 or 310, while an AAIS is used for providing updates to ISCPs 302.

[049] Updates sent to SSPs 308 or 310 may be sent from recent change engine 316 via a switch access 322 that may, for example, convert the updates into the

appropriate protocol for SSP 308 or 310. For example, recent change engine 316 may send updates to SSPs 308 or 310 via TCP/IP. Switch access 322 may then convert the updates from TCP/IP to X.25. This switch access 322 may be implemented using hardware and/or software. These connections may include any number of elements, such as, for example, switches, routers, hubs, etc. and may be, for example, an internal data network for voice network 104.

[050] Voice network 104 may also include one or more intelligent peripherals (IP). For example, in Fig. 3, an IP 320 is illustrated as being connected to SSP 308. These IPs may be used for providing functions for interaction between users and the voice network, such as voice mail services, digit collection, customized announcements, voice recognition, etc. Moreover, the communications between SSP 308 and IP 320 may use the Primary Rate interface (PRi) (e.g., the 1129 protocol) protocol. Additionally, IP 320 may be capable of sending and receiving information to/from Service Center 106. These communications may use, for example, the SR-3511 protocol. Further, although Fig. 3 illustrates this connection as a direct connection, this connection may include any number of elements including routers, switches, hubs, etc., and may be via, for example, an internal data network for voice network 104. In one embodiment, IP 320 may be operable to play various announcements to a calling party during a call screening operation consistent with the principles of the present invention.

[051] Fig. 4 is a block diagram of a service center, consistent with the principles of the present invention. As shown, service center 106 may include firewalls 402 and 404, one or more digital companion servers 406, one or more communication portal

servers 408, one or more network access servers 410, and a voice portal 412. The voice portal 412 may include a voice portal application server 414 and a voice recognition server 416. A network 418 may be used to interconnect the firewalls and servers. Additionally, back end server(s) 420 may be provided between the service center 106 and the voice network 104.

[052] Firewalls 402 and 404 provide security services for communications between service center 106, data network 102, and voice network 104, respectively. For example, firewalls 402 and 404 may restrict communications between user terminal 112 and one or more servers within service center 106. Any appropriate security policy may be implemented in firewalls 402 and 404 consistent with the principles of the present invention. Firewalls 402 and 404 may be implemented using a combination of known hardware and software, such as the Raptor Firewall provided by the Axent Corporation. Further, firewalls 402 and 404 may be implemented as separate machines within service center 106, or implemented on one or more machines external to service center 106.

[053] Network 418 may be any type of network, such as an Ethernet or FDDI network. Additionally, network 418 may also include switches and routers as appropriate without departing from the scope of the invention. Further, additional firewalls may be present in the network 418, for example, to place one or more of servers 406, 408, 410, or voice portal 412 behind additional firewalls.

[054] Each server (406, 408, 410, 414, 416, 420) may be any appropriate type of server or computer, such as a Unix or DOS-based server or computer. The servers

may implement various logical functions, such as those described below. In Fig. 4, a different server is illustrated as being used for each logical function. In other embodiments, the logical functions may be split across multiple servers, multiple servers may be used to implement a single function, all functions may be performed by a single server, etc.

[055] In general, a digital companion server 406 may provide the software and hardware for providing specific services of the service center. Exemplary services include, for example, permitting a customer to add contacts to their address book from a history of calls made or received by the customer, permitting a customer to make calls directly from their address book, scheduling a call to be placed at a specific time, or permitting the customer to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the customer to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, real-time call management, call screening, etc. In one embodiment, real-time call management enables a customer to perform several functions as a call is being received, such as sending a call to voice mail, sending a call received on one device to another device, manually initiating call screening, playing an announcement for the caller, scheduling a call back, bridging a caller onto a current call, etc. Call screening consistent with the present invention may enable a customer, for example, to manually or automatically force callers with unknown or blocked numbers to identify themselves before being allowed to complete a

phone call to the customer. A customer may be a user that subscribes to various services of service center 106.

[056] A communication portal server 408 may provide the hardware and software for managing a customer's account and interfacing with customer account information stored by the provider of customer's voice network 104. Network access servers 410 may provide the hardware and software for sending and receiving information to voice network 104 in processing the applications provided by service center 106. For example, network access servers 410 may be used for transmitting and/or receiving information from/to an ISCP 302 or an SSP 308 or 310 of voice network 104.

[057] Voice portal 412 includes software and hardware for receiving and processing instructions from a customer via voice. For example, a customer may dial a specific number for voice portal 412. Then the customer using speech may instruct service center 106 to modify the services to which the customer subscribes. Voice portal 412 may include, for example, a voice recognition function 416 and an application function 414. Voice recognition function 416 may receive and interpret dictation, or recognize spoken commands. Application function 414 may take, for example, the output from voice recognition function 416, convert it to a format suitable for service center 106 and forward the information to one or more servers (406, 408, 410) in service center 106.

[058] Fig. 5 illustrates a logical architecture of an exemplary system, consistent with the present invention. As illustrated, the logical architecture may be split into four

planes: client side 502, application service 504, network access 506, and the voice network 508.

[059] Client side 502 includes user terminals 112_A and 112_B that a user may use to send and/or receive information to/from the service center 106. Additionally, client side 502 includes the user's phone(s) 114. As discussed above, user terminals 112 may be any type of device a user may use for communicating with Service Center 106. For example, user terminal 112_A may be a PDA running a program for communicating with the Service Center 106, while user terminal 112_B may be a desktop type computer running a web browser for communicating with the Service Center 106 via the Internet. Additionally, the user may have one or more phones 114, such as, for example, one or more standard landline telephones and/or wireless phones.

[060] Application service plane 504 includes digital companion server(s) 406, communication portal server(s) 408, and voice portal 412. These entities may communicate between one another using, for example, web services or any other suitable protocols. Web services are a standardized way of integrating Web-based applications using the Extensible Markup Language (XML), Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI) open standards over an Internet protocol (IP) backbone.

[061] As illustrated, a digital companion server 406 may provide the following functions: a client proxy 512, a web server 514, an application server function 516, a

calendar server function 518, a notification server function 520, and a database function 522. Each of these functions may be performed in hardware, software, and/or firmware. Further, these functions may each be executed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[062] Client proxy function 512 provides a proxy function for the digital companion that may be used for security purposes. This client proxy function 512 may be included in a separate server such that all communications sent from the other digital companion functions/servers to a user terminal 112 via data network 102 go through client proxy 512. Also, if client proxy 512 is included on a separate server, for example, an additional firewall may be provided between the client proxy 512 and the other digital companion servers to provide additional security.

[063] Web server 514 provides functionality for receiving traffic over data network 102 from a customer. For example, web server 514 may be a standard web server that a customer may access using a web browser program, such as Internet Explorer or Netscape Communicator.

[064] Application server function 516 encompasses the general functions performed by digital companion server(s) 406. For example, these functions may include interfacing with the various other digital companion functions to perform specific services provided by the service center. These services may include, for example, interfacing with other function(s), software, and/or hardware to provide a customer with the capability of managing their calls online. For example, permitting a customer to add contacts to their address book from a history of calls made or received by the customer,

permitting a customer to make calls directly from their address book, scheduling a call to be placed at a specific time, or permitting the customer to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the customer to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, enabling call management with user intervention in real-time, call screening, etc.

[065] Additionally, application server function 516 may interface with one or more external devices, such as an external web server, for retrieving or sending information. For example, application server function 516 may interface with a voice network's data center 556 (e.g., verizon.com) to determine the services to which the customer subscribes (e.g., call waiting, call forwarding, voice mail, etc.).

[066] Calendar server function 518 may provide the capability of scheduling events, logging when certain events occurred, triggering the application-functions to perform a function at a particular time, etc.

[067] Notification server function 520 provides the capability to send information from service center 106 to a user terminal 112. For example, the notification server function 520 at the direction of the application server function 516 may send a notification to the user terminal 112 that the user (e.g., customer) is presently receiving a phone call at the user's phone 114. This notification may be, for example, an instant message pop-up window that provides an identification of the caller as well as the number being called. The notification may also have a number of user-selectable

buttons or items associated with it that enable the user (e.g., customer) to manage a call in real-time.

[068] Database function 522 provides the storage of information useable by the various applications executed by the digital companion servers. These databases may be included in, for example, one or more external storage devices connected to the digital companion servers. Alternatively, the databases may be included in storage devices within the digital companion servers themselves. The storage devices providing the database function 522 may be any type of storage device, such as for example, CD-ROMs, DVD's, disk drives, magnetic tape, etc.

[069] As discussed above, the communication portal server(s) 408 provide the hardware and software for managing a customer's account and interfacing with customer account information stored by the provider of customer's voice network 104. As illustrated in Fig. 5, a communication portal server 408 may provide the following functions: a web server function 526, an application server function 528, a contacts database function 530, and/or a customer profile function 532. Each of these functions may be performed by a separate server, split across multiple servers, included on the same server functions, or any other manner.

[070] Web server function 526, as with web server function 514 of the digital companion servers, provides functionality for receiving traffic over the data network 102 from a customer. For example, web server function 514 may be a standard web server that a customer may access using a web browser, such as Internet Explorer or Netscape Communicator.

[071] Application server function 528 encompasses the general functions performed by communication portal servers 408. For example, these functions may include interfacing with the voice network to retrieve and/or modify customer profile information, and creating and editing an address book for the user. Additionally, application server function 528 may include the functionality of sending and/or receiving information to/from external servers and/or devices. For example, communication portal servers 408 may be connected to a network, such as, the Internet. Application server function 528 may then provide connectivity over the Internet to external servers 552 that provide web services, such as the Superpages web page. Application server function 528 could then contact these external services 552 to retrieve information, such as an address for a person in the user's address book.

[072] In another example, application server function 528 of communication portal 408 may interface a single sign on (SSO) server 554. SSO 554 may be used to allow users to access all services to which the user subscribes, on the basis of a single authentication that is performed when they initially access the network.

[073] Moreover, application server function 528, similar to application server 516, may provide functionality to facilitate services performed by the service center. These services may include, for example, interfacing with other function(s), software, and/or hardware to provide a customer with the capability of managing their calls online. For example, permitting a customer to add contacts to their address book from a history of calls made or received by the customer, permitting a customer to make calls directly from their address book, scheduling a call to be placed at a specific time, or

permitting the customer to look at the name and/or address associated with a phone number. Additionally, these services may include permitting the customer to listen to their voice mail on-line, forwarding their calls based on a scheduler and/or the calling parties number, setting up conference calls on-line, enabling call management with user intervention in real-time, call screening, etc.

[074] Contacts database 530 includes storage devices for storing an address book for the user. This address book may be any appropriate type of address book. For example, the user's address book may include the names, phone numbers, and addresses of people and/or organizations. These storage devices may be internal or external to communication portal servers 406 or some combination in between. In addition, these storage devices may be any type of storage device, such as magnetic storage, memory storage, etc.

[075] Customer profile database 532 includes storage devices for storing customer profile information for the user. These storage devices may be the same or separate storage devices used for the contacts database. The customer profile may include information regarding the user's account for their voice network. For example, this information may include the user's name, billing address, and other account information. Additionally, the customer profile may include information regarding voice services to which the user subscribes, such as, for example, call waiting, voice mail, etc.

[076] Application services plane 504 of the architecture may also include voice portal 412. As discussed above, voice portal 412 may include, for example, a voice

recognition function 416 and an application server function 414, and be used for receiving and processing instructions from a customer via voice. The voice recognition function may be implemented using hardware and/or software capable of providing voice recognition capabilities. This hardware and/or software may be a commercially available product, such as the Voice Application platform available from Tellme Networks, Incorporated. Application server function 414 of voice portal 412 may include hardware and/or software for exchanging information between digital companion servers 406 and voice recognition function 416. Additionally, application server function 414 may be included on a separate server, included in the hardware and software providing voice recognition function 416, included in digital companion servers 406, etc.

[077] Network Access plane 506 of the architecture includes the functions for providing connectivity between application service plane 502 and voice network 104. For example, this plane may include recent change engines 316, network access servers 410, and/or back end servers 420.

[078] As discussed above, recent change engines 316 may be used to update switches and ISCP databases included in the voice network 104. In one embodiment, recent change engines 316 may include an AAIS 544, an eRC 546, and/or an MSP 548. Additionally, a proxy 542 may be used between digital companion servers 406 and recent change engines 542 for security purposes.

[079] Network access servers 410 may be included in service center 106 and may provide the hardware and software for sending and receiving information to voice

network 410 in processing the applications provided by the service center. For example, network access servers 410 may include a Caller ID (CID) functionality for retrieving caller ID information from voice network 104, a click to dial (CTD) functionality for instructing an intelligent peripheral (IP) in voice network 104 to place a call via an SSP, a real time call management (RTCM) functionality for interfacing with an ISCP of the voice network, and/or an additional call screening functionality for protecting users from callers with blocked, unknown, or otherwise undesirable numbers.

[080] Network Access plane 506 may also include one or more back end server(s) 420. These back end server(s) 420 may include hardware and/or software for interfacing service center 106 and voice network 104. Back end server(s) 420 may be connected to service center 106 by a network, by a direct connection, or in any other suitable manner. Further, back end server(s) 420 may connect to one or more devices in voice network 104 by a network, a direct connection, or in any other suitable manner.

[081] Back end server(s) 420 may include, for example, a server providing a voice mail retrieval and notification function. This voice mail retrieval and notification function may include the capability to receive notifications when a user receives a voice mail, physically call a user's voice mail system, enter the appropriate codes to retrieve the voice mail, retrieve the voice mail, convert the voice mail to a digital file, and send it to digital companion servers 406.

[082] Additionally, these back end server(s) 420 may also include, for example, a directory assistance server. This directory assistance server may interface service center 106 with a Reverse Directory Assistance Gateway (RDA Gateway) of voice

network 104. An RDA Gateway is a device for issuing requests to a Data Operations Center (DOC) of voice network 104 for name and/or address information associated with a phone number and receiving the name and/or phone number in response to this request.

[083] In another example, back end server(s) 420 may include a wireless internet gateway that is used for interfacing with a mobile switching center (MSC) of a wireless voice network. As with above-described back end server(s) 420, this wireless internet gateway may be used for converting requests and information between the formats used by service center 106 and those used by the wireless voice network.

[084] In yet another example, back end server(s) 420 may include a conference blasting server for instructing a conference bridge in voice network 106 to dial out via an SSP to the participants of a voice conference. Alternatively, for example, the back end server(s) may include a server for instructing an IP of the voice network to place a call between two parties by dialing out to each of the parties. The back end server(s) may also include the capability to instruct the bridge or IP device to call an audio digitizing device that can listen to the conference, convert the audio signals to digital format, and forward the digitized signals to a user device via, for example, an audio streaming server. The audio streaming server may, for example, allow a user to connect to it via, for example, the Internet. Additionally, the audio streaming device may buffer or record the signals to permit the user to pause, rewind, and/or fast-forward thru the conference.

[085] In yet another example, back end server(s) 420 may include a Single Number Short Message Service (SN SMS) server for interfacing service center 106 with

a Short Message Service (SMS) gateway in voice network 104. This may be used to permit the customer to have SMS messages addressed to their home phone number directed to an SMS capable device of the users choosing.

[086] Voice network plane 508 includes the hardware and software included in the voice network 104, as discussed above with reference to Fig. 3. For example, voice network plane 508 may include ISCP SPACE 314, ISCP 302, intelligent peripherals 320, and SSP 308. Additionally, voice network plane 508 may also include the hardware and software included in a wireless carrier's network, such as, for example, the mobile switching center, etc.

System Operation

[087] Figs. 6A and 6B comprise a diagram of an exemplary flowchart of a method for preemptively rejecting phone calls in a manner consistent with the present invention. Although the steps of the flowchart are described in a particular order, one skilled in the art will appreciate that these steps may be performed in a modified or different order. Further, one or more of the steps in Figs. 6A and 6B may be performed concurrently or in parallel.

[088] As illustrated in Figs. 6A and 6B, a calling party first initiates a call to a customer (step 602). For example, a calling party 120 may use a phone, such as phone 122, to place a call to phone 114 of a customer, such as user 110. In one embodiment, the call may be routed from a phone to a voice network, such as voice network 104, where an SSP 308 or 310 may intercept the call (step 604). SSP 308 or 310 may intercept the call because it encountered a "trigger," such as a terminating

attempt trigger or a specific digit string trigger, associated with the call. For example, a trigger may be set at SSP 308 or 310 on each of the lines corresponding to a digital companion customer. In this manner, a trigger is set to detect calls received at the SSP that are directed to telephone numbers of digital companion customers. In addition, triggers may be set on lines corresponding to digital companion customers that have the call screening enabled. As such, calls to telephone numbers associated with digital companion customers having call screening are detected by the triggers. For the purposes of this description, it is those calls that the SSP intercepts.

[089] After intercepting the call, SSP 308 or 310 sends a query to ISCP 302 requesting further instructions. In response, ISCP 302 sends call information to a network access server 410 (step 606). In one embodiment, the call information may be sent to network access server 410 via a Generic Data Interface (GDI), using a message structure associated with GDI (e.g., GetData, SendData, or InvokeApp). The call information may also be sent in an encrypted form.

[090] The call information may include, for example, call state data, a call intercept parameter, a voice mail parameter, time zone data, user ID, called number data, calling name data, calling number data, and calling party number (CPN) presentation information. One of ordinary skill in the art will appreciate that additional information may be included with the call information, or that some of the previously noted information may be omitted from the call information.

[091] Call state data may provide the current call state based on processing (e.g., AIN processing) that has already occurred for the call. For example, some

possible values for call state data may be indicative of a call being authorized for termination, a call being to a call intercept (CI) service node or IP, a call being from a CI service node or IP, a call being a priority call from the CI service node or IP, a call having a CI error encountered on a call to a CI service node or IP, or a call being on the first leg of a click-to-dial call.

[092] The call intercept parameter identifies when a customer has subscribed to the call intercept feature. In one embodiment, a call intercept feature allows a customer to block invalid numbers that typically appear as "unavailable," "private," "anonymous," or "out of area" on a caller ID display. The feature may tell callers that unidentified calls are not accepted and ask them to record a name. If an unidentified caller does not record a name or enter an override code, the called party's phone will not ring, thus eliminating interruptions from unidentified callers. This feature is separate from the call screening feature consistent with the present invention, though the features share some functionality.

[093] The voice mail parameter identifies when a subscriber has voice mail capability. Time zone data refers to the customer's time zone. Called number data refers to the number of a called device associated with the subscriber. User ID refers to a parameter that may have one of two values. If a distinctive ring feature is present, then user ID is set to a primary number value. If no such feature is present, then user ID is set to the same value as the called number. Distinctive ring, for example, may provide a customer with additional telephone numbers on a single line, with their own

unique ringing pattern. A customer's primary number is the main number associated with the line.

[094] Calling number data refers to the number of the calling party 120. This parameter may contain such a number when it is available. In addition, the parameter may contain a calling party address when the information is made available by a previously executed AIN service. Otherwise, the calling number parameter may include some arbitrary string of digits or characters (e.g., ten zeros) when the caller ID information does or does not match a particular format.

[095] Calling name data refers to the name of the calling party. This parameter may be retrieved, for example, by ISCP 302 from a database such as LIDB 312. It may be typically possible to retrieve the calling name when the database was populated with this data by a previously executed AIN service. If the calling name is not successfully retrieved, then the calling name parameter may include, for example, an arbitrary string of digits or characters (e.g., zeros) indicative of situations where there was no response from LIDB 312, there was an erroneous response from LIDB 312, there was no name returned from LIDB 312, the format of the caller ID is not in conformance, or the caller ID presentation is restricted.

[096] ISCP 302 may also send an announcement to an SSP where the call is being handled. The announcement can be some kind of recording that is played for the calling party. This announcement has the effects of preventing a call timer in the SSP from expiring and giving the calling party an indication that the call is progressing. ISCP

302 may continue to cause the announcement to be played while waiting for a response from network access server 410.

[097] Upon receiving the call information from ISCP 302, network access server 410 may decrypt the information, if necessary, and forward the received information to application server 516 (step 608). Application server 516 may then determine whether the customer associated with the triggered phone number (e.g., destination/dialed phone number) is logged into a digital companion server 406 (step 610). Application server 516 makes this determination, for example, by performing a lookup in a database, such as database 522, using the called number as an index. Based on the called number, application server 516 can determine a digital companion customer ID. This digital companion customer ID may have a number of access points (e.g., user terminals 112) associated with it. Application server 516 may lookup entries in database 522 that correspond to the digital companion customer ID to determine whether the customer is currently logged onto a digital companion server 406 using any access points. For example, whenever a customer is logged on using an access point, an indication of such is stored in database 522. If application server 516 finds such an indication in database 522, then it knows that the customer is logged on, and it knows which access point the customer is using.

[098] If the customer is not logged on anywhere, then there is no way for service center 106 to communicate with the customer using digital companion operations. Instead, service center 106 logs the call (step 612). When the customer logs in at a later time, the customer is provided with an indication that the customer was

called. Calls may be logged, for example, in database 522 or in other storage on digital companion server 406 or communication portal server 408. The call may be subsequently routed without digital companion processing (e.g., call may be completed as dialed, if possible) (step 614).

[099] If the customer is logged on, then application server 516 retrieves call preference information from a database (step 615). In one embodiment, the database storing this call preference information may be database 522, customer profile database 532, or another database used to stored customer-related data. The call preference information may include, for example, call block lists, lists of forwarding devices or telephone numbers, voice mail preferences, lists of recordings that the customer can set as pre-recorded messages, etc.

[0100] A determination is also made as to whether RTCM is enabled for this customer (step 616). Such as determination may be made, for example, using triggers to detect calls to digital companion customers having the real-time call management feature enable. As such, one of ordinary skill in the art will appreciate that by the time application server 516 retrieves call preferences in step 615, it may already be known whether the customer has the RTCM feature enabled.

[0101] If the RTCM feature is enabled for this customer, then application server 516 may proceed to provide the customer with appropriate call management options (step 622). As part of this step, application server 516 may proceed to determine whether the call screening, call intercept feature, and/or voice mail features are enabled for the called party by examining the call information received from the network access

server 410. Application server 516 makes this determination so that it knows which options should be made available to a called party using RTCM. One of ordinary skill in the art will appreciate that the application server 516 may also check for any other feature that can be enabled and disabled. Application server 516 also determines the CPN presentation value associated with the call by examining the call information received from network access server 410. The CPN presentation value is determined so that the calling party's CPN information can either be displayed or not displayed for the customer.

[0102] Thereafter, application server 516 may provide the collected information (e.g., call information, call preference information, and access point information) to notification server 520 and instruct notification server 520 to send an RTCM notification to the customer associated with the called number (e.g., by providing an indication of the access point that the customer is using to the notification server 520). Notification server 520 has open connections to all devices (e.g., user terminals 112) that are logged on. When notification server 520 receives information from application server 516, it uses the information to route an RTCM notification to the customer at the appropriate access point (e.g., user terminal 112). In one embodiment, the RTCM notification may be sent using a protocol such as HTTP (Hypertext Transfer Protocol), Java, or a similar protocol.

[0103] The RTCM notification may be a notification of the incoming call to the customer. The notification may include a display having a number of customer-selectable buttons associated with it that enable the customer to manage a call in real-

time. For example, the notification may have different buttons that permit a customer to send a call to voice mail, send a call received on one device to another device, perform a call screening operation, accept a call, play an announcement, place a call on hold, schedule a call back operation, perform an automatic call back operation, perform a call block operation, or bridge a caller onto the current call (e.g., initiate a conference call).

[0104] The notification may provide the customer with different options dependent on the features for which the customer is authorized and has enabled. For example, if the customer does not have call screening enabled, then the RTCM notification will not include a user-selectable area corresponding to the call screening operation. If the customer does not have voice mail enabled, then the RTCM notification will not include a user-selectable area corresponding to voice mail. One of ordinary skill in the art will appreciate that any feature that can be enabled and disabled may be used as a basis for altering the RTCM notification (e.g., conference call, etc.).

[0105] Once it has received the RTCM notification, the customer's selected device displays the RTCM notification, including the customer-selectable buttons associated with it. The device does not yet ring. Even though the device is not yet ringing, the caller may hear on the calling device (e.g., the phone or other device used to place the call) a ringing tone or an announcement indicating that the call is proceeding. Network access server 410 then waits for a response from the customer (step 624). Response information may include, for example, call disposition information, forwarding number information, nature of forwarding number information, carrier access code, announcement type, and ring cadence. One of ordinary skill in the

art will appreciate that additional data may be included with the response data, or that some of the previously noted data may be omitted from the response data.

[0106] Call disposition information may provide an indication of the customer's choice for how the call should be handled. For example, call disposition information may include an indication of sending a call to voice mail, sending a call received on one device to another device (e.g., call forwarding), performing a call screening operation, accepting a call, playing an announcement, placing a call on hold, scheduling a call back operation, performing an automatic call back operation, performing a call block operation, or bridging a caller onto the current call.

[0107] When a call forwarding operation is invoked, forwarding number information includes a number to which the call should be forwarded. Nature of forwarding number information identifies the nature of the call forwarding number. For example, a number may be a national number or an international number.

[0108] Carrier access code may be a sequence of digits indicative of a specific carrier when a call should be routed using the specific carrier.

[0109] Announcement type identifies an announcement that should be played to the caller. This parameter, for example, may be used when the customer selects the play announcement option.

[0110] Ring cadence may be indicative of the ring cadence value that should be applied for the call. For example, different values may be used to designate normal cadence; short, short cadence; and short, short, long cadence; or any other possible cadences.

[0111] If, after a predetermined period of time, the notification server 520 has not received a response, then a determination is made as to whether the number belonging to the calling party is invalid (step 618). For example, application server 516 may decide whether a calling party number is blocked or otherwise unavailable. If the number is blocked or unavailable, then the process proceeds to step 632, described below. If the number is not blocked or unavailable, then the call is accepted for the device receiving the call (step 620). For example, after a period of time, the RTCM notification, if any, may disappear from the device's display and the device may start ringing (e.g., if there is no RTCM notification, ringing may occur right away). The customer may answer the call if he or she is available and chooses to do so. One of ordinary skill in the art will appreciate that other default actions may occur instead of allowing the call to go through. For example, a busy signal may be played, the call may be sent to voice mail, the call may be forwarded to a preferred forwarding number, an announcement may be played, etc.

[0112] If the customer responds by selecting one of the RTCM options, then the RTCM notification disappears from the display, and network access server 410 receives the response and encrypts it, if necessary (step 626). Network access server 410 proceeds to instruct ISCP 302 to route the incoming call based on the response from the customer. In one embodiment, network access server 410 instructs ISCP 302 by sending ISCP 302 the response information via a connection such as a GDI link. The ISCP 302 may decrypt the response data, if necessary, and route the call based on the response. For example, the service logic associated with ISCP 302 may take different

actions based on the call disposition information and other information included in the response. If a call screening option is not selected (step 628 - No), then ISCP 302 may route the call without screening it (step 630). Exemplary call routing options other than call screening include place call on hold, forward call to another device, voice mail, accept call, play announcement, schedule call back, auto call back, conference call, and block call. Further information on each of these options may be found in U.S. Patent Application No. __________ (Attorney Docket No. 03-1016), which has already been incorporated by reference.

[0113] If the customer selects a call screening option (step 628 - Yes), then network access server 410 may instruct ISCP 302 to initiate performance of a call screening operation (step 632). ISCP 302 may then instruct an intelligent peripheral, such as IP 320 to play a recorded announcement for the calling party (step 634). For example, IP 320 may play an announcement requesting that the calling party leaves a spoken name, a PIN (personal identification number), or a voice message. In one embodiment, the announcement may be accompanied by a Special Instruction Tone (SIT) cadence. In this manner, telemarketers or other unwanted callers may be inclined to no longer proceed with the call either because they (e.g., human callers or automatic mechanisms used to call a large number of people in a short period of time) do not want to leave a spoken name or they hear the SIT cadence, which may automatically trigger a mechanism to cease the call. Exemplary SIT cadence may include tones listed in Supplement 2 to ITU-T Recommendation E.180, or other suitable tones.

[0114] After playing the announcement, IP 320 determines whether or not an override code (e.g., PIN) has been entered by the calling party (step 636). A customer, for example, may want to give close friends, family, or other important people, such an override code, so that the person has no problem getting through the call screen. If the calling party enters a valid override code, then ISCP 302 proceeds to route the call to the customer (step 638). When the customer either does not enter an override code or enters an invalid override code, a determination is made as to whether the calling party wishes to record a spoken name (step 640).

[0115] If the calling party chooses not to record a name, then ISCP 302 promptly ends the call (step 642). The end of the call may be proceeded by an additional announcement informing the calling party that the call is about to end. On the other hand, if the calling party chooses to record a name, then the calling party may proceed to do so (step 644). ISCP 302 may then cause a call to be placed to the customer (e.g., the called party) at the customer's device and play the recording once the customer answers the call (step 646). In one embodiment, the call to the customer's device may be accompanied by a notification that gives the customer the option of accepting the call, diverting the call to voice mail, denying the call, placing the call on hold, playing another announcement, forwarding the call to another device, scheduling a call back, initiating an automatic call back operation, initiating a conference call, etc. One of ordinary skill in the art will appreciate that fewer options or more options may be presented to the customer.

[0116] The customer's device may be preset or manually provided by the customer in response to a query. For example, the customer may have a plurality of devices and choose to receive calls at one preferred device when a call screening operation is in progress. One of ordinary skill in the art will appreciate that different preferred devices may be set according to the type of call being received (e.g., type of operation in progress), or the same preferred device may be set regardless of the type of call. Once the customer has made a selection, the call is routed according to that selection (step 648). If the customer fails to respond within a predetermined period of time, the a default action may be initiated. A default action may include diverting the call to voice mail, accepting the call, playing an announcement, etc.

[0117] Fig. 7 is a diagram of an exemplary user interface 700 including customer-selectable real-time call management options. User interface 700 may be a display on a customer device, such as user terminal 112 or phone 114, that is currently showing an RTCM notification. The RTCM notification includes an area 702 indicating that the customer has an incoming call. Area 702 also provides an identification of the caller as well as the number being called. The number being called may belong to the device displaying the RTCM notification or another device. The RTCM has a number of user-selectable areas 704-722 associated with it, allowing the customer to decide how an incoming call is routed. In one embodiment, the customer may select one of these user-selectable areas through any suitable input methods. For example, the customer may click on the desired option using a mouse, touch an appropriate area of a

touchscreen, enter input on a keypad, etc., in order to choose the manner in which the incoming call is routed.

[0118] Selecting area 704 enables the customer to answer the call on the device that received the RTCM notification (e.g., the device the includes user interface 700). Selecting area 706 forwards the call to voice mail. Selecting area 708 initiates a call screening feature consistent with the present invention as discussed above with reference to Figs. 6A and 6B. Selecting area 710 places the call on hold. Selecting area 712 forwards the call to another device of the customer's choosing. Selecting area 714 plays an announcement for the calling party. Selecting area 716 enables a customer to schedule a call back event on a calendar. Selecting area 718 enables a customer to cause the calling party to be automatically called back after the current call. Selecting area 720 bridges call party onto the current call. Selecting area 722 causes a recording to be played indicating that the customer does not wish to speak to the calling party and optionally cause the calling party's telephone number to be added to a call block list.

[0119] Fig. 8 is a diagram of an exemplary user interface 800 that enables a customer to change preferences consistent with the present invention. As illustrated in Fig. 8, a customer may have the ability to enable or disable real-time call management for a given device. The customer also may select particular devices to handle different actions. For example, a customer may set specific phone numbers to handle features such as answer calls, send to voice mail, forward call, and/or telemarketer zap (e.g., call screening). One of ordinary skill in the art will appreciate that other features may

also have phone numbers set for them. The customer also has the option of viewing various other settings associated with the customer, such as a list of numbers that are call blocked, call back settings, etc.

[0120] While the present invention has been described in connection with various embodiments, many modifications will be readily apparent to those skilled in the art. One skilled in the art will also appreciate that all or part of the systems and methods consistent with the present invention may be stored on or read from computer-readable media, such as secondary storage devices, like hard disks, floppy disks, and CD-ROM; a carrier wave received from a network such as the Internet; or other forms of ROM or RAM. Accordingly, embodiments of the invention are not limited to the above described embodiments and examples, but instead is defined by the appended claims in light of their full scope of equivalents.